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Ferrets as Laboratory Animals: A Bibliography



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Ferrets as Laboratory Animals: A Bibliography

By

Karen J. Clingerman
National Agricultural Library
Animal Welfare Information Center
Beltsville, MD 20705-2351

James G. Fox
Marian Walke
Massachusetts Institute of Technology
Division of Comparative Medicine
Cambridge, MA 02139

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Preface

This bibliography contains "selected" literature citations on the ferret and its use in biomedical research. Topics include: ferret physiology, care and handling, and use in biomedical research. The document is designed to serve as a reference tool for individuals involved in the care or use of ferrets in the laboratory setting. While not comprehensive, the document provides extensive coverage of ferret biology, diseases, and use as an animal model.

This bibliography was produced jointly by the Animal Welfare Information Center of the National Agricultural Library (NAL) of the U.S. Department of Agriculture and the Massachusetts Institute of Technology (MIT). Dr. James Fox, with the assistance of Marian Walke, of MIT contributed a large portion of the information from his own collection of ferret literature. NAL provided additional citations via extensive database searching. Databases searched include: AGRICOLA, MEDLINE, BIOSIS, LIFESCIENCES, and ZOOLOGICAL RECORD.

The document is organized by subject headings which include: Anatomy/Physiology, Behavior, Techniques, Anesthesia/Surgery, Diseases, and Animal Models. Citations within the subject headings are arranged in reverse chronological order (based on publication date). When available, the NAL call number is provided for the materials located at the National Agricultural Library. An author index is provided at the end of the document.

The inclusion of a publication in this bibliography does not constitute an endorsement by the U.S. Department of Agriculture.

FERRETS AS LABORATORY ANIMALS: A BIBLIOGRAPHY

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Introduction

The ferret (*Mustela putorius furo*) is thought to have originated from the wild European polecat or ferret and may also be related to the steppe polecat. Early accounts in Greek literature suggest that the ferret has been domesticated for over 2,000 years (24). Historically, ferrets have been used for hunting rabbits and for rodent control. "Ferreting" as it is known, is thought to have originated in North Africa. The practice was then introduced in Asia, Europe, and the British Isles, and is still practiced in some countries (5). Today, ferret popularity as both a pet and a laboratory animal is increasing.

Ferrets share many anatomical, metabolic, and physiologic features with humans which has promoted their use as an animal model (520). Ferrets are used in biomedical research in a wide variety of studies including cardio-pulmonary, neurological, and gastrointestinal research. For example, ferrets are used to examine: ischemia and ion exchange in the heart muscle, pulmonary mucus secretion related to asthma or influenza, neurological changes associated with brain and spinal cord injury, and gastric infections and ulcerations. Ferrets have also been used as a model for the demonstration of medical procedures such as pediatric tracheal intubation. Use of ferrets may also be an alternative to the use of dogs, cats, or primates in some studies (5).

Research on the physiology, behavior, nutritional requirements, and husbandry of the ferret has increased our knowledge of this species. As a result, new techniques in disease diagnosis and treatment, anesthesia and surgery, and basic care and handling have been developed. The information generated from this research on the basic biology of the ferret (i.e., normal biological data, disease processes, genetic makeup) is critical when using the ferret in biomedical research. This information is also required by those veterinarians, researchers, and staff responsible for ensuring adequate care and management of ferrets in biomedical research, and by the veterinarian who treats pet ferrets.

GENERAL INFORMATION AND NORMAL BIOLOGICAL DATA

LABORATORY ANIMALS

001

"Practice tips for ferret medicine." D. Kemmerer. *JAVMA - Journal of the American Veterinary Medical Association* 94(12):1817 (1989). NAL: 41.8 Am3.

KEYWORDS: abstract; disease; care; treatment; handling; equipment; medication.

002

"What technicians need to know about ferrets." D. Kemmerer. *JAVMA - Journal of the American Veterinary Medical Association* 194(12):1809(1989). NAL: 41.8 Am3.

KEYWORDS: abstract; handling; restraint; breeding; behavior; veterinary medicine.

003

"Use of the ferret in behavioral research." M.J. Baum. In: *Biology and Diseases of the Ferret* (ed.) J. G. Fox. Lea & Febiger, Philadelphia. 1988. pp. 315-323. NAL: SF407.F39B56.

KEYWORDS: behavior; locomotion; play; experiments.

004

"Use of the ferret in reproductive neuroendocrinology." M.J. Baum. In: *Biology and Diseases of the Ferret* (ed.) J. G. Fox. Lea & Febiger, Philadelphia. 1988. pp. 324-335. NAL: SF407.F39B56.

KEYWORDS: endocrinology; puberty; ovulation; neurons; seasonal cycles.

005

"Taxonomy, history, and use." J.G. Fox. In: *Biology and Diseases of the Ferret* (ed.) J. G. Fox. Lea & Febiger, Philadelphia. 1988. pp. 3-13. NAL: SF407.F39B56.

KEYWORDS: mustela putorius; utilization; pets; biomedical research; rodent control; production.

006

"Ferret Medicine: Part I (Mustela putorius furo)." D.L. Hammond. *Mississippi Veterinary Journal* pp. 19-20(Summer 1987).

KEYWORDS: general information; veterinary care.

007

"Let us now praise famous ferrets." S. Young. *New Scientist* pp. 53(April 1987). NAL: 472 N42.

KEYWORDS: history; miscellaneous uses.

008

"Biology and medicine of the ferret." C.L. Besch-Williford. *Veterinary Clinics of North America Small Animal Practice* 17(5):1155-1184(1987). NAL: SF601.V523.

KEYWORDS: review; behavior; cancer; nutrition; reproduction; virus; parasite; housing; bacteria; fungus.

009

"**Rodents, rabbits and ferrets: Small mammal medicine.**" E.C.G.M. Hampson. *Australian Veterinary Practitioner* 16(2):87-99(1986). NAL: SF601 A9.
KEYWORDS: review; medical problems; housing; nutrition; mouse; rat.

010

"**Compendium of recent literature on the ferret.**" K.A. Frederick and J.G. Babisch. *Laboratory Animal Science* 35(3):298-318(June 1985). NAL: 410.9 P94.
KEYWORDS: bibliography.

011

The Complete Book of Ferrets. V. Porter and N. Brown. Pelham Books, London. 1985. pp. 1-184.
KEYWORDS: care in captivity; techniques; mustela-furo; housing; management.

012

"**Establishment and characterization of ferret cells in culture.**" R.S. Trowbridge, J. Lehmann and P. Brophy. *In Vitro* 18(11):952-960(November 1982). NAL: QH585 A1Z58.
KEYWORDS: neuroanatomy; brain; Mpf cells.

013

"**Ferrets.**" T.J. Burke. *Scientific Presentations of the Annual Meeting of the American Animal Hospital Association* 1981 pp. 77-79. NAL: 41.9 AM36.
KEYWORDS: housing; reproduction; restraint; nutrition; diseases; anesthesia.

014

"**Laboratory animals.**" E.S.E. Hafez. In: *Reproduction in Farm Animals, 4th Edition* (ed.) E.S.E. Hafez. Lea & Febiger, Philadelphia. 1980. NAL: SF768.H3.
KEYWORDS: guinea pig; mouse; hamster; rat; lemming; mink; chinchilla; ferret; vole; deer mouse; gerbil; cat; dog; opossum.

015

"**Veterinary care of ferrets, raccoons and skunks.**" E. Thatcher. *Iowa State University Veterinarian* 42(1):27-36(1980). NAL: 41.8 V6425.
KEYWORDS: techniques; captive animals; treatment; diseases; handling.

016

"**The mustelids.**" In: *Grzimek's Animal Life Encyclopedia*, vol 12. (ed.) H.C.B. Grzimek. Van Nostrand Reinhold Co., New York. 1975. pp 48-77. NAL: QL45 G71.
KEYWORDS: general information.

017

"**The biomedical use of ferrets in research; A synopsis of papers published through 1967 with a supplemental bibliography of some papers published but not reviewed.**" E.W. Hahn and R.C. Wester. In: *Marshall Research Animals, Inc.* Marshall Research Animals, Inc., New York. 1969. NAL: QL55.H3.
KEYWORDS: experimental animals; anatomy; physiology.

018

"The ferret and its diseases." L.M. Ryland and J. Gorham. *JAVMA - Journal of the American Veterinary Medical Association* 173(9):1154-1158(November 1978). NAL: 41.8 Am3.
KEYWORDS: housing and care; diseases.

019

"Ferrets." F. Beck. In: *Pathology of Laboratory Animals* (Eds.) K. Bunirschke, F.M. Garner and T.C. Jones. Springer-Verlag, New York. 1978. pp. 1869-1873. NAL: SF996.5 P37.
KEYWORDS: intrauterine death; malformations.

020

"Procyonidae and Mustelidae." P.H. Kaufmann. In: *Zoo and Wild Animal Medicine* (ed.) M.E. Fowler. W.B. Saunders, Philadelphia. 1978. pp. 637-639. NAL: SF996.Z66.
KEYWORDS: general information.

021

"The ferret [as a laboratory animal]." S.W. Hall. *Lab Animal* 6(6):58,57(Nov./Dec. 1977). NAL: QL55.A1L33.
KEYWORDS: housing; breeding; diet; drug administration; diseases.

022

"Family Mustelidae." L.S. Crandall. In: *Management of Wild Mammals in Captivity*. University of Chicago Press, Chicago. 1965. pp. 323-326. NAL: QL77.5 C7.
KEYWORDS: general information.

023

"Normal mouth and intestinal flora of the ferret (*Mustela furo* L)." M.E. Davies. *Nature* 175:1048(June 1955). NAL: 472 N21.
KEYWORDS: anatomy; digestive system; mouth; bacterial cultures.

024

"A history of the ferret." A.P.D. Thomson. *Journal of the History of Medicine* 6:471-480(Autumn 1951).
KEYWORDS: history.

025

"How to destroy rats: USDA Farmers Bulletin 1915." United States Department of Agriculture. *USDA Farm Bulletin 1915* [no publishing information].
KEYWORDS: uses; rodent exterminators.

PETS/TRAINED ANIMALS

026

"The domestic ferret: Pet of the nineties?" F.A. Hoffman. *FDA Veterinarian* 6(3):1-2,10-11(May/June 1991). NAL: SF917 F42.
KEYWORDS: domestication; behavior; care; reproduction.

027

"Fair shake for ferrets local man's aim." [interview with Ian Chadwick, founder of Domestic Ferret Assn. of Canada] M. Comer. *Beach Metro News* pp. 12(September 1989).
KEYWORDS: pets.

028

"Are there ferrets in the future of your pet store?" B. Crabtree. *Pet Product News* pp. 32-36(January/February 1989).
KEYWORDS: pets; commercial products.

029

"Attack ferrets?" G. Childs. *JAMA - Journal of the American Medical Association* 261(11):1583-1584(1989). NAL: 448.9 Am37.
KEYWORDS: pets; controversy.

030

"Attack ferrets?" B.A. Lauer and J.W. Paisley. *JAMA - Journal of the American Medical Association* 261(11):1584(1989). NAL: 448.9 Am37.
KEYWORDS: pets; controversy.

031

"More on ferrets as pets." [with a reply by K.R. Marshall] T.R. Eng and S.R. Jenkins. *JAVMA - Journal of the American Veterinary Medical Association* 193(8):904-905(October 1988). NAL: 41.8 Am3.
KEYWORDS: pets; controversy.

032

"Ferrets as pets." K.R. Marshall. *JAVMA - Journal of the American Veterinary Medical Association* 193(2):160-161(July 1988). NAL: 41.8 Am3.
KEYWORDS: pets; controversy.

033

"Severe facial injuries to infants due to unprovoked attacks by pet ferrets." J.W. Paisley and B.A. Lauer. *JAMA - Journal of the American Medical Association* 269(13):2005-2006(April 1988). NAL: 448.9 Am37.
KEYWORDS: pets; attacks on humans.

034

"Ferret chic." C. Suplee. *Washington Post* pp. 15-17(April 1988).
KEYWORDS: pets; controversy.

035

"Profiles: ratcatcher." [biographic article on Brian Plummer] R.C. Smith. *New Yorker* pp. 41-58(February 1988).
KEYWORDS: history; ferreting.

036

"The 'domestic' ferret -- pet or problem for owners?" D. Knox. *NACA News* pp. 7(1987/8).

KEYWORDS: pets; controversy.

037

"Ferret controversy." *JAVMA - Journal of the American Veterinary Medical Association* 190(3):262(February 1987). NAL: 41.8 Am3.

KEYWORDS: pets; controversy.

038

"AVMA position on pet ferrets." *JAVMA - Journal of the American Veterinary Medical Association* 188(10):1122(May 1986). NAL: 41.8 Am3.

KEYWORDS: pets; controversy.

039

"The pet of the year isn't a pinup or a pup but it is just as cute." D. Petzke. *Wall Street Journal*(April 1986).

KEYWORDS: pets.

040

"Pet ferrets require special safety considerations." S. Groseclose and J.T. Horman. *Norden News* pp. 33-34(Winter/Spring 1986). NAL: 41.8 N75.

KEYWORDS: pets; rabies.

041

"No merit in owning ferrets." N. Blaney. *Animal Activist Alert* 4(1):2(1986). NAL: KF3841.A15A55.

KEYWORDS: pets; controversy.

042

"Pet European ferrets: A hazard to human infants." S.L. Diesch. In: *Proceedings, 90th annual meeting, US Animal Health Association, Louisville, KY.* 1986. pp. 364-366.

KEYWORDS: pets; controversy.

043

"Preventive medical care for the pet ferret." R.W. Randolph. *Current Veterinary Therapy* IX:772-774(1986). NAL: SF745 C78.

KEYWORDS: veterinary care; pets; vaccinations.

044

"Need for data on ferrets that bite, eat human flesh, or develop rabies." *California Morbidity* (1986).

KEYWORDS: pets; controversy; rabies.

045

"A clinical guide to the pet ferret." L.M. Ryland, S.L. Bernard and J.R. Gorham. *Continuing Education* 5(1):25-32(January 1983). NAL: LC5201 C6.

KEYWORDS: general information; biological data; diseases; surgery.

046

"Reported human injuries or health threats attributed to wild or exotic animals kept as pets (1971-1981)." S.L. Diesch. *JAVMA - Journal of the American Veterinary Medical Association* 180(4):382 383(February 1982). NAL: 41.8 Am3.

KEYWORDS: pets; controversy; rabies.

047

"The hazards occurring by the private ownership of wild and exotic animals to animal and public health." S.L. Diesch. In: *Proceedings, 86th annual meeting, US Animal Health Association, Nashville TN*. 1982. pp. 46-49.

KEYWORDS: pets; controversy.

048

"Should wild-exotic animals be banned as pets?" S.L. Diesch. *The California Veterinarian* pp. 13-18(December 1981). NAL: 41.8 C12.

KEYWORDS: pets; controversy.

049

Ferrets and Ferreting. I. Brodie. Blanford Press, Ltd., London. 1978. 79 pp. NAL: SK293.B7.

KEYWORDS: history; uses; housing; hunting; training; breeding.

050

All about ferrets. [pamphlet] M.F. Roberts. TFH Publications, Neptune City, NJ. 1977.

KEYWORDS: general information; pets.

051

Ferrets and Ferreting: A Practical Manual on Their Breeding, Managing, Training, and Working, 15th ed. A. Niblett. Bazaar, Exchange & Mart, London. 1954(?).

KEYWORDS: ferreting; training.

052

What's a Ferret? [pamphlet] S. Yost, B. Limberg and D. Kimbrough. [publishing information not given] pp. 1-7.

KEYWORDS: general information; pets.

BLACK-FOOTED FERRETS

053

"Black-footed ferret recovery: a progress report." T.W. Clark. *Conservation Biology* 1(1):8-11(May 1987). NAL: QH75 A1C5.

KEYWORDS: black-footed ferret.

054

"My friend the ferret." M. Pearce. *Wall Street Journal* pp. 30(October 1986).

KEYWORDS: black-footed ferret.

055

"The cautionary tale of the black-footed ferret." R.M. May. *Nature* 320(6):13-14(March 1986).

NAL: 472 N21.

KEYWORDS: black-footed ferret.

056

"On the track of the last black-footed ferrets." L. Richardson. *Natural History* pp. 69-77(February 1986). NAL: 500 N483J.

KEYWORDS: black-footed ferret.

057

"The decline and fall of the black-footed ferret." D. Weinberg. *Natural History* pp. 63-69(February 1986). NAL: 500 N483J.

KEYWORDS: black-footed ferret.

058

"Furred and furious: A look at weasels and their kin." C.E. Harold. *Conservationist* pp. 19-21(January/February 1982). NAL: 279.8 N48.

KEYWORDS: general information.

NORMAL BIOLOGICAL DATA

059

"Pulmonary vascular pressure profile in adult ferrets measurements in vivo and in isolated lungs." J.U. Raj, J. Anderson, R. Hillyard and P. Kaapa. *American Review of Respiratory Disease* 141(4 part 2):A738(1990).

KEYWORDS: cardiovascular system; reference values; physiology.

060

"A comparison of sperm morphology and silver nitrate staining characteristics in the domestic ferret and the black-footed ferret." P.T. Curry, T. Ziemer, G. Van der Horst, W. Burgess, M. Straley, R.W. Atherton and R.M. Kitchin. *Gamete Research* 22(1):27-36(January 1989). NAL: QH481 G3.

KEYWORDS: biological data; black-footed ferret; cryopreservation; semen evaluation.

061

"Electrocardiographic values from clinically normal, anesthetized ferrets (*Mustela putorius furo*).". L. Bone, A.H. Battles, R.D. Goldfarb, C.W. Lombard and A.F. Moreland. *American Journal of Veterinary Research* 49(11):1884-1887(November 1988). NAL: 41.8 Am3A.

KEYWORDS: anesthesia; ketamine; zylazine; drug effects; physiology; heart rate.

062

"Serum thyroxin and triiodothyronine radioimmunoassay values in the normal ferret." B.A. Geribaldi, M.E. Pecquet Goad, J.G. Fox and R. Murray. *Laboratory Animal Science* 38(4):455-468(August 1988). NAL: 410.9 P94.

KEYWORDS: blood serum; physiology; biochemistry; laboratory animal.

063

"Serum cortisol radioimmunoassay values in the normal ferret and response to ACTH stimulation and dexamethasone suppression tests." B.A. Garibaldi, M.E. Pecquet Goad, J.G. Fox, T.J. Sylvina and R. Murray. *Laboratory Animal Science* 38(4):452-454(August 1988). NAL: 410.9 P94.

KEYWORDS: blood serum; corticotrophin; physiology; pharmacology.

064

"Basic reference information on ferrets." *Norden News* pp. 32-37(Winter/Spring 1988). NAL: 41.8 N75.

KEYWORDS: biological data.

065

"Changes in physiologic and clinicopathologic values in domestic ferrets from 12 to 47 weeks of age." J.P. Hoover and C.A. Baldwin. *Companion Animal Practice* 2:40-44(January 1988). NAL: SF98.C64.

KEYWORDS: blood chemistry; diagnostic techniques; biochemistry; physiology.

066

"Normal clinical and biologic parameters." J.G. Fox. In: *Biology and Diseases of the Ferret* (ed.) J. G. Fox. Lea & Febiger, Philadelphia. 1988. pp. 159-173. NAL: SF407.F39B56.

KEYWORDS: ferrets; immune response; diseases; hematology; metabolism.

067

"The ferret." P.L.R. Andrews and O. Illman. In: *UFAW Handbook*, 6th edition, (ed.) T. Poole. Longman Scientific and Technical Publishers, London. 1987. pp. 436-455. NAL: OL55.U5.

KEYWORDS: general information; biological data; diseases.

068

"Ferret Medicine: Part II." D.L. Hammond. *Mississippi Veterinary Journal* pp. 2-6(1987?).

KEYWORDS: biological data; diseases.

069

"Veterinary work with non-domesticated pets. II. Mammals." J.E. Cooper. *British Veterinary Journal* 142:240-433(1986). NAL: 41.8 V63.

KEYWORDS: biological data; diseases; surgery; anesthesia.

070

"Serum chemistry and hematology reference values in the ferret *Mustela putorius furo*." J.G. Fox, L.C Hotaling, B.P. Ackerman and K. Hewes. *Laboratory Animal Science* 36(5):583(1986). NAL: 41.9 P94.

KEYWORDS: blood cells; laboratory animal; glucose; albumin; bilirubin; electrolytes; enzymes.

071

"**Electrocardiogram of normal ferrets and ferrets with right ventricular hypertrophy.**" S.H. Smith and S.P. Bishop. *Laboratory Animal Science* 35(3):268-271(June 1985). NAL: 410.9 P94.

KEYWORDS: biological data; electrocardiogram; ventricular hypertrophy.

072

"**Ferrets.**" J.E. Cooper. In: *Manual of Exotic Pets*, rev. ed. (eds.) J.E. Cooper, M.F. Hutchison, O.F. Jackson and R.J. Maurice. British Small Animal Veterinary Association, Gloucester. 1985. pp. 93-98. NAL: SF981 M36.

KEYWORDS: general information; biological data.

073

"**Binding of staphylococcal protein A by the sera of different animal species.**" D.D. Richman, P.H. Cleveland, M.N. Oxman and K.M. Johnson. *Journal of Immunology* 128(5):2300-2305(May 1982). NAL: 448.8 J8232.

KEYWORDS: biological data; staphylococcal protein A; serum.

074

"**Haematological and serum chemistry profiles of ferrets (*Mustela putorius furo*).**" E.J. Lee, W.E. Moore, H.C. Fryer and H.C. Minocha. *Lab Animal* 16:133-137(1982). NAL: QL55.A1L33.

KEYWORDS: biological data.

075

"**Cell-mediated immunity in ferrets: Delayed dermal hypersensitivity, lymphocyte transformation, and macrophage migration inhibitory factor production.**" C.A. Kauffman. *Developmental and Comparative Immunology* 5:125-134(1981). NAL: QR180.D4.

KEYWORDS: biological data; lymphocytes; animal models.

076

"**Lymphocyte subpopulations in the ferret.**" C.A. Kauffman and A.G. Bergman. *Developmental and Comparative Immunology* 5:671-678(1981). NAL: QR180.D4.

KEYWORDS: biological data; lymphocytes.

077

"**The metabolism of bifluranol by rat, dog and ferret.**" D.J. Pope, A.P. Gilbert, D.J. Easter, R.P. Chan, J.C. Turner, S. Gottfried and D.V. Parke. *Journal of Pharmacy and Pharmacology* 33(5):302-308(1981). NAL: RS11.J6.

KEYWORDS: biological data; metabolism; bifluranol; rat; dog.

078

"**Ontogeny of the ferret humoral immune response.**" S.C. Suffin, G.A. Prince, K.B. Muck and D.D. Porter. *Journal of Immunology* 123(1):6-9(July 1979). NAL: 448.8 J8232.

KEYWORDS: biological data; immunoglobin; neonates.

079

"Drug metabolism in the ferret: Effects of age, sex and strain." C. Ioannides, B. Sweatman, R. Richards and D.V. Parke. *General Pharmacology* 8:243 249(1977). NAL: RM1.C63.
KEYWORDS: biological data; metabolism.

080

"The ferret [as a laboratory animal]." J. Hammond, Jr. and F.C. Chesterman. In: *UFAW Handbook for the Care and Management of Laboratory Animals* Universities Federation for Animal Welfare, U.K. 1976. pp. 357-366. NAL: QL55.U5.
KEYWORDS: housing; standard biological data; handling; transport; breeding; drug administration; anaesthesia; diseases.

081

"Semen volume and sperm concentration in the ferret (*Mustela putorius*)."
A.U. Shump, R.J. Aulerich and R.K. Ringer. *Laboratory Animal Science* 26(6/I):913 915(1976). NAL: 410.9 P94.
KEYWORDS: biological data; semen; sperm.

082

"The ferret." J. Hammond, Jr. and F.C. Chesterman. In: *UFAW Handbook* Longman Scientific and Technical Publishers, London. 1972. pp 357-366. NAL: QL55.U5.
KEYWORDS: general information; biological data; diseases.

083

"The ferret (*Mustela putorius furo L.*)."
I.W. Rowlands. In: *UFAW Handbook*, 3rd ed. E&S Livingstone Ltd., London. 1967. pp 582-593. NAL: QL55.U5.
KEYWORDS: general information; biological data; diseases.

ANATOMY/PHYSIOLOGY

084

"The effects of metabolism on $\text{Na}^+ \text{K}^+ \text{Cl}^-$ co-transport in ferret red cells."
P.W. Flatman. *Journal of Physiology* 437:495-510(June 1991). NAL: 447.8 J82
KEYWORDS: blood cells; potassium transport; furosemide; system; volume; ATP; phosphorylation; activation.

085

"Sensory innervation of the mystacial pad fur of the ferret."
T.M. Mosconi and F.L. Rice. *Neuroscience Letters* 121(1-2):199-202(1991). NAL: QP351 N3.
KEYWORDS: development; guard hair; vellus hair; nervous system; physiology.

086

"Magnesium transport in ferret red cells."
P.W. Flatman and L.M. Smith. *The Journal of Physiology* 431:11-25(December 1990). NAL: 447.8 J82.
KEYWORDS: physiology; blood cells; potassium transport; $\text{Na}^+/\text{Mg}^{2+}$ antiport.

087

"Pulmonary vascular pressure profile in 2-3-week-old, 5-6-week-old and adult ferrets." J.U. Raj, R. Hillyard, P. Kaapa, J. Anderson and M. Gropper. *Respiration Physiology* 82(3):307-315(December 1990). NAL: QP121.A1R4.

KEYWORDS: physiology; respiratory system; microvascular pressures; micropuncture measurement; circulation.

088

"Adaptation of the mechanisms controlling gastric motility following chronic vagotomy in the ferret." P.L.R. Andrews and S. Bingham. *Experimental Physiology* 75(6):811-825(November 1990). NAL: QP43 E9.

KEYWORDS: physiology; gastrointestinal system; truncal vagotomy; vagus nerves; intragastric pressure.

089

"Lack of detectable blood groups in domestic ferrets: Implications for transfusion." D.D. Manning and J.A. Bell. *JAVMA - Journal of the American Veterinary Medical Association* 197(1):84-86(July 1990). NAL: 41.8 Am3.

KEYWORDS: physiology; blood; transfusion; surgery.

090

"Comparative anatomy, physiology, and function of the upper respiratory tract." G.K. Reznik. *Environmental Health Perspectives* 85:171-176(April 1990). NAL: RA565.A1E54.

KEYWORDS: anatomy; histology; cats; dogs; ferrets; guinea pigs; hamsters; horses; mice; rats.

091

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GROWTH AND DEVELOPMENT

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BEHAVIOR

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KEYWORDS: behavior; learning; mink; skunk; cat.

DIETS/NUTRITION

176

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NAL: 41.8 V641.
KEYWORDS: surgery; anesthesia.

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KEYWORDS: animal diseases; infectious diseases; animal husbandry; treatment; immunization.

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KEYWORDS: ferrets; digestive tract; histopathology; diagnosis; treatment.

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KEYWORDS: systemic diseases; cardiomyopathy.

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KEYWORDS: reproductive disorders; ferrets; bacterial diseases; histopathology; diagnosis; treatment.

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KEYWORDS: estrus; anemia.

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KEYWORDS: estrus; anemia; ovariohysterectomy; blood transfusions.

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KEYWORDS: anemia; estrus.

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KEYWORDS: campylobacter-like organisms; pylori subsp. mustelae; animal models; infection; stomach; eradication; mucosa; Helicobacter (Campylobacter) pylori.

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KEYWORDS: diseases; Helicobacter(Campylobacter) pylori; gastritis; animal models.

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KEYWORDS: diseases; animal models; Campylobacter jejuni; enteric disease.

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KEYWORDS: diseases; *Helicobacter (Campylobacter) mustelae*; *Helicobacter (Campylobacter) pylori*; animal models.

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KEYWORDS: diseases; *Campylobacter jejuni*.

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KEYWORDS: diseases; *Helicobacter (Campylobacter) mustelae*; *Helicobacter (Campylobacter) pylori*; animal models.

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KEYWORDS: diseases; proliferative colitis.

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KEYWORDS: diseases; Campylobacter-like organisms; *Helicobacter (Campylobacter) pylori*.

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KEYWORDS: diseases; *Helicobacter (Campylobacter) pylori*; *Campylobacter jejuni*.

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KEYWORDS: diseases; proliferative colitis.

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KEYWORDS: diseases; campylobacter-like organisms.

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KEYWORDS: diseases; proliferative colitis; campylobacter-like organisms.

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KEYWORDS: ferrets; epizootiology; diagnosis; treatment; diseases.

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KEYWORDS: diseases; campylobacteriosis; *Campylobacter* *jejuni*; animal models.

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KEYWORDS: diseases; proliferative colitis.

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KEYWORDS: bacteria; gastric lesions; gastric mucosa; models.

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KEYWORDS: diseases; *Campylobacter jejuni*; colitis; diarrhea.

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KEYWORDS: diseases; mycobacteria; *Mycobacterium bovis*.

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KEYWORDS: diseases; mycoplasma.

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KEYWORDS: diseases; campylobacteriosis; zoonoses.

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KEYWORDS: diseases; proliferative colitis; pets.

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KEYWORDS: diseases; Leptospirosis.

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KEYWORDS: diseases; botulism.

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KEYWORDS: diseases; listeriosis.

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KEYWORDS: diseases; salmonellosis.

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KEYWORDS: diseases; salmonellosis.

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KEYWORDS: diseases; salmonellosis.

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KEYWORDS: diseases; tuberculosis.

DISEASES - Viral/chlamydial

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"Exacerbation of bacterial toxicity to infant ferrets by influenza virus: Possible role in sudden infant death syndrome." K.J. Jakeman, D.I. Rushton, H. Smith and C. Sweet. *Journal of Infectious Diseases* 163(1):35-40(January 1991). NAL: 448.8 J821.

KEYWORDS: diseases; influenza; syndrome SIDS; host; toxin; shock.

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KEYWORDS: virus; pathogenesis.

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KEYWORDS: Aleutian mink disease; diagnosis; pathology; immunoelectrophoresis.

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KEYWORDS: diseases; rabies; vaccine.

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KEYWORDS: diseases; Aleutian disease; parvovirus.

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KEYWORDS: diseases; rabies; vaccine.

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KEYWORDS: diseases; rabies; vaccine.

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KEYWORDS: pets; safety; live vaccine.

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KEYWORDS: diseases; influenza.

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KEYWORDS: diseases; influenza.

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KEYWORDS: diseases; influenza; macrophages; animal models.

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KEYWORDS: diseases; influenza; trachea; glycoconjugates.

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KEYWORDS: diseases; canine distemper; rabies; vaccines.

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KEYWORDS: diseases; influenza; encephalitis.

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KEYWORDS: diseases; influenza; neonates.

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KEYWORDS: diseases; influenza; diagnosis.

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KEYWORDS: diseases; influenza; animal models; *Staphylococcus aureus*; respiratory tract.

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KEYWORDS: diseases; respiratory syncytial virus.

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KEYWORDS: diseases; Aleutian disease.

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KEYWORDS: diseases; influenza; immunization.

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KEYWORDS: diseases; influenza.

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KEYWORDS: diseases; influenza.

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KEYWORDS: diseases; influenza.

DISEASES - Parasitic

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KEYWORDS: diseases; parasites; Dracunculus insignis.

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KEYWORDS: diseases; parasites; Dracunculus insignis.

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KEYWORDS: systemic diseases; *Brugia malayi*; acquired resistance; lymphatic pathology.

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KEYWORDS: diseases; parasites; *Brugia malayi*; filariasis.

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KEYWORDS: diseases; parasites; Leishmania; protozoa.

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KEYWORDS: diseases; parasites; cryptosporidium; protozoa.

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KEYWORDS: parasites; protozoal infections; ectoparasites; helminths; diagnosis; treatment.

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KEYWORDS: diseases; parasites; Brugia malayi.

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KEYWORDS: diseases; parasites; Sarcoptes scabiei.

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KEYWORDS: diseases; parasites; Dirofilaria immitis.

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KEYWORDS: diseases; parasites; Dirofilaria immitis.

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KEYWORDS: diseases; parasites; Trichinella spiralis.

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KEYWORDS: diseases; parasites; *Sarcocystis*.

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KEYWORDS: diseases; parasites; *Toxoplasma*.

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KEYWORDS: diseases; parasites; *Toxoplasma laidlawi*.

DISEASES - Mycotic

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"Mycotic diseases."
J.G. Fox. In: *Biology and Diseases of the Ferret* (ed.) J.G. Fox. Lea & Febiger, Philadelphia. 1988. pp. 248-254. NAL: SF407.F39B56.

KEYWORDS: ferrets; mycoses; etiology; histoplasma; blastomycoses; diagnosis; treatment.

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KEYWORDS: mycotic diseases; Blastomyces dermatitidis; yeast.

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KEYWORDS: mycotic diseases; Cryptococcus neoformans; fungus.

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KEYWORDS: mycotic diseases; Cryptococcus neoformans.

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KEYWORDS: mycotic diseases; Microsporum canis; fungus.

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NEOPLASIA/TUMORS/CARCINOMA

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KEYWORDS: neoplasia; tumors; carcinoma.

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KEYWORDS: neoplasia; tumors; carcinoma.

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KEYWORDS: neoplasia; tumors; carcinoma; skin.

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KEYWORDS: animal models; respiratory system; pollution testing.

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KEYWORDS: animal models; toxicity testing.

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KEYWORDS: neuroanatomy; brain.

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KEYWORDS: nutrition; diets; poison; zinc.

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ANIMAL MODELS - General

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KEYWORDS: animal models.

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ANIMAL MODELS - Cardiovascular

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KEYWORDS: hormone sensitive lipase; fatty acid oxidation; human adipose tissue; Reyes syndrome; malonyl COA; carnitine palmitoyltransferase; lipoprotein lipase; KI values; ketogenesis.

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KEYWORDS: sodium calcium exchange; cardiac hypertrophy; ventricular muscle; pressure overload; purkinje fibers; myocardium; ouabain; cations; cells.

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KEYWORDS: cardiac purkinje fibers; heart; myocardial ischemia; papillary muscles; Ca^{2+} transient; injury current; arrhythmias; reperfusion.

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KEYWORDS: intracellular calcium transients; sarcoplasmic reticulum; inorganic phosphate; heart muscle; Ca^{2+} ; pH; fibers; cells.

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"The length, width, and volume of isolated rat and ferret ventricular myocytes during twitch contractions and changes in osmotic strength." M.R. Boyett, J.E. Frampton and M.S. Kirby. *Experimental Physiology* 76(2):259-270(March 1991). NAL: 447.8 Q1.

KEYWORDS: regional differences; muscle; heart; myocardium; cells.

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KEYWORDS: intracellular calcium levels; stage heart failure; phosphatidylcholine hydrolysis; myocardium; transients; aequorin; Ca^{2+} ; sensitivity; activation.

539

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KEYWORDS: crossbridge kinetics; cardiac; skinning, muscle length.

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KEYWORDS: ventricular muscle; heart cells; intracellular calcium.

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KEYWORDS: heart; animal models; sodium calcium exchange; purkinje fibers; hydrogen exchange; mapillary muscle; microelectrode; transport.

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KEYWORDS: vascular smooth muscle; intracellular pH; mechanical properties; ventricular cells; extracellular pH; calcium; bladder; contraction.

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"The effect of acidosis on the interval-force relation and mechanical restitution in ferret papillary muscle." E. McCall and C.H.Orchard. *Journal of Physiology* 432:45(January 1991). NAL: 447.8 J82.

KEYWORDS: intracellular calcium transients; sarcoplasmic reticulum; ventricular muscle; cardiac muscle; pH; myocardium; fibers; stimulation; contraction.

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KEYWORDS: heart; animal models; sarcoplasmic reticulum; intracellular calcium; ventricular myocytes; contraction; ischemia; pH.

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549

"Differential effects of caffeine on skinned fibers from control and hypertrophied ferret hearts." S. Baudet and R. Venturaclapier. *American Journal of Physiology* 259(6):H1803-H1808(December 1990). NAL: 447.9 AM3.

KEYWORDS: physiology; cardiovascular system; troponin; overload; sarcoplasmic reticulum; calcium; contraction.

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KEYWORDS: physiology; cardiovascular system; NMR; calcium; transients; purkinje fibers; overload; contraction.

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KEYWORDS: physiology; cardiovascular system; capsaicin; fibers; arterial blood pressure.

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KEYWORDS: physiology; cardiovascular system; heart; red blood cells; reperfusion; sensitive microelectrodes.

553

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KEYWORDS: physiology; cardiovascular system; ventricular muscle; calcium.

554

"Recovery of contractility and pH_i during respiratory acidosis in ferret hearts: role of Na⁺-H⁺ exchange." H.E. Cingolani, Y. Koretsune and E. Marban. *American Journal of Physiology* 259(3):H843-H848(September 1990). NAL: 447.8 AM3.

KEYWORDS: physiology; cardiovascular system.

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"Use of the ferret for a myocardial ischemia/salvage model." A.W. Gomoll and R.F. Lekich. *Journal of Pharmacological Methods* 23(3):213-223(May 1990). NAL: QP901 J6.

KEYWORDS: heart; surgery; anesthesia; animal models; ischemia/reperfusion; myocardial damage/salvage.

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KEYWORDS: physiology; cardiovascular system; mitochondria.

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KEYWORDS: physiology; cardiovascular system; Na/Ca exchange.

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"The effects of 2,3-butanedione monoxime on initial heat, tension, and aequorin light output of ferret papillary muscles." E.M. Blanchard, G.L. Smith, D.G. Allen and N.R. Alpert. *Pfluegers Archives* 416:219-221 (1990).

KEYWORDS: physiology; cardiovascular system; muscles; heat production.

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KEYWORDS: smooth muscle tone; substance P; sensory neuropeptides; mucus secretion; binding sites; CGRP; capsaicin; nerves.

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KEYWORDS: physiology; respiratory system; endothelial cell-derived constricting factor; calcium channel.

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KEYWORDS: animal models; pulmonary system; mucus; neuropeptides; asthma.

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KEYWORDS: physiology; respiratory system; airway responses; constriction; guinea pig.

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KEYWORDS: physiology; respiratory system; asthma; bronchomotor tone; bronchospasm; anaphylaxis.

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KEYWORDS: animal models; animal welfare; pediatrics; teaching.

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KEYWORDS: physiology; respiratory system; neuropeptides.

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KEYWORDS: animal models; pulmonary system.

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KEYWORDS: animal models; intratracheal intubation; croup; drug therapy.

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KEYWORDS: animal models; pulmonary system; in vitro preparation.

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KEYWORDS: abstract; animal model; methodology; pediatrics; anesthetics; laryngeal edema.

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KEYWORDS: animal models; pulmonary system.

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KEYWORDS: animal models; pulmonary system.

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KEYWORDS: animal models; respiratory system.

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KEYWORDS: lateral geniculate nucleus; visual cortex; infusion; tetrodotoxin; projection; potentials; cells; field.

628

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KEYWORDS: parotid gland; vasoactive intestinal peptide; gene-related peptide; salivary secretion; nerve stimulation; blood flow; neuropeptides; depletion; release.

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KEYWORDS: cross correlation analysis; lateral geniculate nucleus; neurons; inhibition; connections; sensitivity; mechanisms; area 17.

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KEYWORDS: dimorphic nucleus; prenatal estrogen; brain; lesions; regions; steroids; marking.

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KEYWORDS: abnormal visual pathways; ganglion cells; projections.

632

"**Estradiol binding in the sexually dimorphic nucleus of the preoptic anterior hypothalamic area of adult male ferrets and in the equivalent region of females.**" S.A. Tobet and M.J. Baum. *Brain Research* 546(2):345-350(April 1991).

KEYWORDS: central nervous system; autoradiographic localization; concentrating cells; sex differences; brain; behavior; estrogen; testosterone; accumulation; receptors.

633

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KEYWORDS: ortho-cresyl phosphate; triphenyl phosphite; peripheral nerve; tolyl phosphate; spinal cord; esterase; degeneration; inhibition; neuropathy.

634

"**Vaginocervical stimulation of ferrets induces release of luteinizing hormone-releasing hormone.**" C.E. Bibeau, S.A. Tobet, E.L.P. Anthony, R.S. Carroll, M.J. Baum and J. C. King. *Journal of Neuroendocrinology* 3(1):29-36(1991).

KEYWORDS: central nervous system; immunocytochemical localization; estrous cycle; neurons; secretion; precursor; biosynthesis; testosterone; gonadectomy.

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KEYWORDS: animal models; central nervous system; nucleotide regulatory proteins; recognition sites; area postrema; binding sites; membranes; visualization.

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KEYWORDS: physiology; central nervous system; hearing loss; inferior colliculus; Golgi method; protein synthesis.

637

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KEYWORDS: surgery; anesthesia; parotid saliva; secretion; atropine; reflex; submaxillary; nerve.

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KEYWORDS: physiology; central nervous system; auditory response.

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KEYWORDS: physiology; central nervous system; auditory response.

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KEYWORDS: animal models; brain injuries; movement disorders; coma; physiopathology.

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KEYWORDS: neuroanatomy; brain; visual cortex; deoxyglucose.

642

"Prechiasmatic reordering of fibre diameter classes in the retinofugal pathway of ferrets." G.E. Baker. *European Journal of Neuroscience* 2:24-33(1990).

KEYWORDS: physiology; central nervous system; optic nerve; optic tract; fiber order; axon diameter.

643

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KEYWORDS: physiology; central nervous system; optic nerve.

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KEYWORDS: physiology; central nervous system; ultrastructure; binaural interaction; superior olivary complex.

646

"Distribution and morphology of corticogeniculate axons in ferrets." A. Claps, V.A. Casagrande. *Brain Research* 530:126-129(1990).

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ANIMAL MODELS - Parasitic Infection

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